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Review of the Sino-Japanese Plant Bug Genus *Parapantilius* REUTER (Heteroptera, Miridae), with Description of a New Species from Taiwan

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Abstract The Sino-Japanese mirine plant bug genus *Parapantilius* REUTER is redefined. A new species, *P. taiwanicus*, is described, and the two known species, *P. thibetanus* REUTER and *P. flavomarginatus* MIYAMOTO et YASUNAGA, are diagnosed. The male and female genitalia of each species are described and illustrated. A key to the species is provided.

Key words: Heteroptera; Miridae; *Parapantilius*; new species; key.

The genus *Parapantilius* of the subfamily Mirinae was proposed by REUTER (1903) to accommodate a single species, *P. thibetanus*, from Tibet, the southwestern part of China. It had been little known for about eight decades until MIYAMOTO and YASUNAGA (1989) added a new species, *P. flavomarginatus*, to the genus, based on the specimens from Taiwan and the Ryukyus, Japan; they described and illustrated the male genitalia but did not compare with those of *thibetanus*. Subsequently, ZHENG and LIU (1992) redescribed and illustrated the external structure of *P. thibetanus* in their faunal study and provided the additional distributional records in China. However, since *thibetanus* and *flavomarginatus* exhibit great similarity in external appearance, it has been doubtful whether the two are each distinctive species.

Recently, through the courtesy of Prof. Le-yi ZHENG and some members of Nankai University of Tianjin, China, I could obtain some specimens of *P. thibetanus*. I particularly compared them with those of *P. flavomarginatus* from the Ryukyus, Japan and Taiwan, and concluded that they are actually close relatives but should be stated as different species allopatrically distributed. In the meantime, several specimens from Taiwan, offered by Mr. S. GOTOH of Tanabe City, do not correspond to any of the two known species, judging from the external appearance and genital structure; they are regarded as third, undescribed species of *Parapantilius* endemic to Taiwan.

In the present paper, the genus *Parapantilius* is redefined, based on both external diagnostic characters and genital structure. *Parapantilius taiwanicus* is described as new, and the two known species are each diagnosed. The male and female genitalia of each species are described and illustrated in detail. A key to the three species is also provided.

All measurements in the text are given in millimeters. Terminology of the female genitalia is mainly followed after KELTON (1955) and SLATER (1950). Depositories of the specimens examined are abbreviated in the text as follows: DBNU: Department of Biology, Nankai University, Tianjin, China, L.-y. ZHENG; HUE: Biological Laboratory, Hokkaido University of Education, Sapporo, T. YASUNAGA; MC: Miyamoto collection, Sawara-ku, Iikura, Fukuoka, S. MIYAMOTO.

Genus *Parapantilius* REUTER, 1903

Type species: *Parapantilius thibetanus* REUTER, 1903, Öfvers. finsk. Vetensk. Soc. Förhandl., **45** (16): 6, by monotypy.

Parapantilius REUTER, 1903, Öfvers. finsk. Vetensk. Soc. Förhandl., **45** (16): 6; KIRKALDY, 1906, Trans. Am. ent. Soc., **32**: 136; OSHANIN, 1906–'09, Annu. Mus. zool. l'Acad. Imp. Sci. St. Petersb., **11–14**: 651; REUTER, 1910, Acta Soc. Sci. fenn., **37** (3): 160; OSHANIN, 1912, Kat. pal. Hem., p. 60; HSIAO, 1942, Iowa St. Coll. J. Sci., **15**: 258; CARVALHO, 1952, Ann. Acad. Brazil Cienc., **24**: 91; CARVALHO, 1955, Bol. Mus. Goeldi, **11** (2): 87; CARVALHO, 1959, Arq. Mus. nac. Rio de Janeiro, **48**: 186.

Body large, robust, subparallel-sided; dorsal surface with both dark hairs and silvery pubescence. Head oblique, rather shagreened, with dark short hairs; eyes small, almost contiguous to pronotal collar; vertex wide, with a shallow mesal longitudinal sulcation, not carinate basally; tylus projected anteriorly. First and 2nd antennal segments thick; the former uniformly covered with dark stiff setae; 3rd and 4th segments slenderer. Rostrum rather short, reaching middle coxae.

Pronotum with a dark median spot behind calli, irregularly and transversely rugose, with dark short hairs and silvery pubescence, lateral carination weak; collar broad, about as thick as base of 2nd antennal segment; epimeron with a dark spot; scutellum transversely rugose. Hemelytra long, rather shagreened, clothed with both dark hairs and silvery decumbent pubescence; cuneus about 3 times as long as its basal width. Legs long; femora with dark small spots, bearing some pale trichobothria and dark setae; tibiae with pale spines and pale setae; 3rd segments of hind tarsi longer than 1st or 2nd.

Male genitalia: Parameres sparsely with sensory hairs; left paramere semicircularly curved; right paramere straight, with small apical hooked process. Vesica composed of three membranous lobes, usually with 5 lobe-sclerites (Fig. 2 E–F, α–ε); ejaculatory duct expanded apically; gonoporal rim rather thick, distinct.

Female genitalia: Sclerotized ring elongate-oval, large; posterior wall accompanyed with a pair of flap-like inter-ramal lobes laterally.

This genus is related to *Pantilius* CURTIS, 1875, and is distinguished by the oblique head, weak lateral carina of the pronotum, less projected and not reflexed posterolateral pronotal angles and different genital structure; in *Pantilius* the head is vertical (see MIYAMOTO and YASUNAGA, 1989, Fig. 2), the pronotum is distinctly carinate laterally and projected and somewhat reflexed at the posterolateral angles, and the vesical lobe-sclerites are apparently different in form (see YASUNAGA, 1992,

Figs. 2–3).

Parapantilius is known from three species distributed only in evergreen broad-leaved forests of the eastern Asia.

Parapantilius thibetanus REUTER

(Figs. 1 A & C; 2 A–B & E; 3 A & C)

Parapantilius thibetanus REUTER, 1903, Öfvers. finsk. Vetensk. Soc. Förhandl., **45** (16): 6, fig. 2; REUTER, 1906, Annu. Mus. zool. l'Acad. Imp. Sci. St. Petersb., **10**: 4; OSHANIN, 1906–'09, *Ibid.*, **11–14**: 651; OSHANIN, 1912, Kat. Pal. Hem., p. 60; CARVALHO, 1952, Ann. Acad. Brazil Cienc., **24**: 91; CARVALHO, 1959, Arq. Mus. nac. Rio de Janeiro, **48**: 186; ZHENG & LIU, 1992, *in* Forest Ins. China, p. 297, fig. 907.

Diagnosis. Recognized by the longer antenna, yellow basal 3/4 part of the 3rd antennal segment, yellow basal 1/2–2/3 of the 4th segment and elongate cuneus which is darkened at the apical 1/3. A redescription of external diagnostic characters and a figure were provided by ZHENG and LIU (1992).

Male genitalia (Fig. 2): Parameres (A–B) sparsely clothed with sensory hairs; right paramere wholly sclerotized, without any membranous portions (A). Vesica (E) with 5 distinct lobe-sclerites; lobe-sclerite α composed of pointed teeth, fused

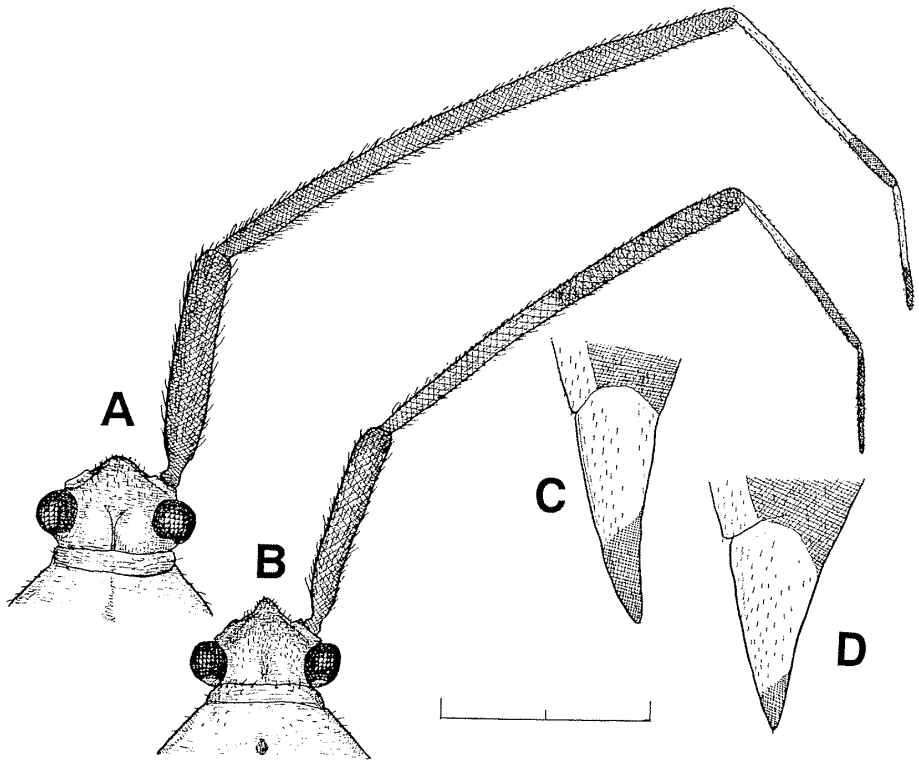

Fig. 1. Female head (A–B) and cuneus (C–D) of *P. thibetanus* (A & C) and *P. flavomarginatus* (B & D). Scale: 2 mm.

with β which is pointed and somewhat hooked at apex; γ rather broad and somewhat flattened, minutely toothed along apical margin, with some longitudinal furrows; δ and ε small, pointed at apices.

Female genitalia (Fig. 3): Sclerotized ring (A), composed of rather thick rim; posterior wall (C) enlarged, with wide and inwardly projected inter-ramal lobes, reduced median process and rather large dorsal structure.

Dimensions. ♂: Body length 10.90, head width 1.38, vertex width, 0.64, length of antennal segments I–IV as 2.00: 4.73: 2.15: 1.25, rostral length 3.53, pronotal

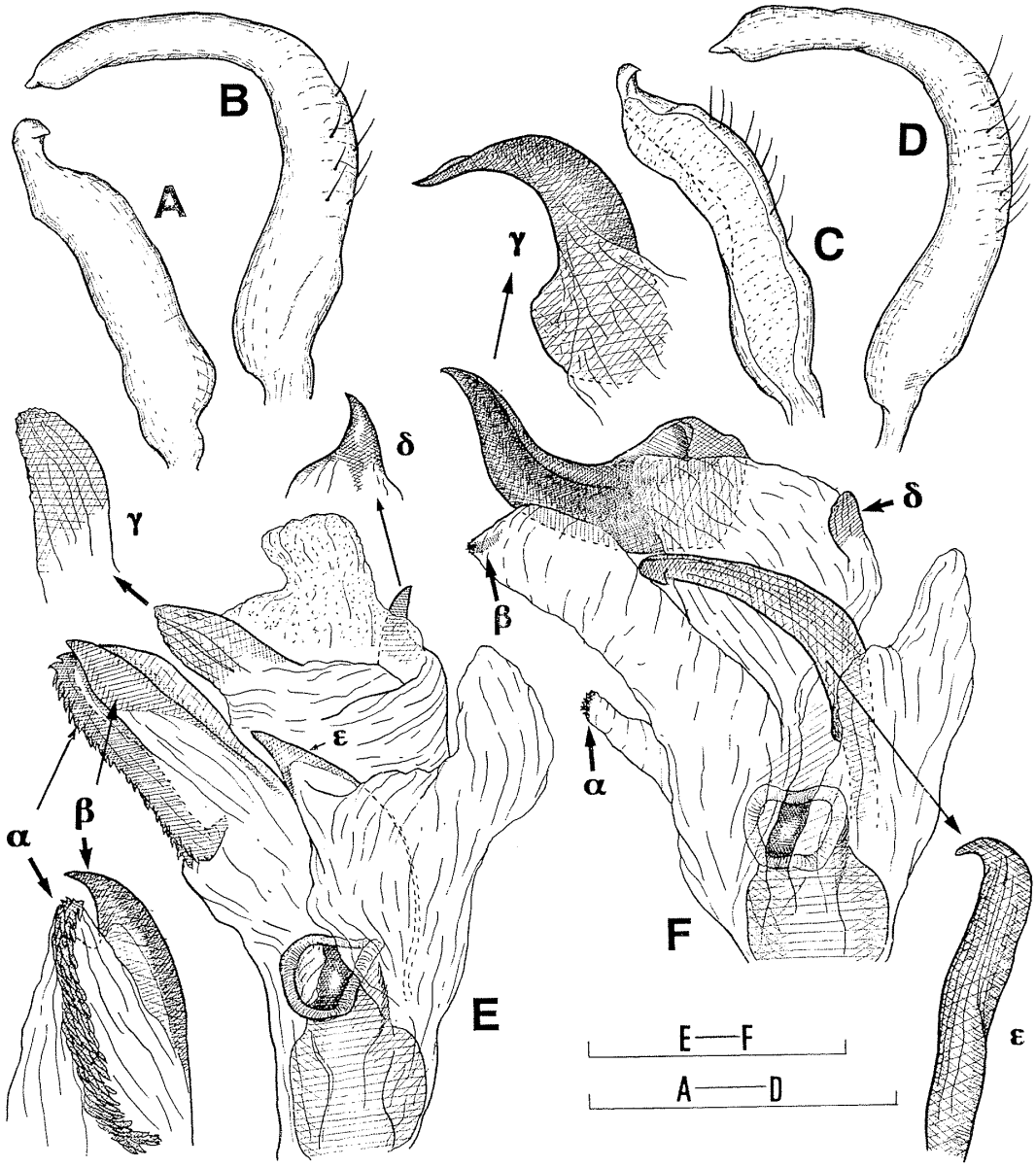

Fig. 2. Male genitalia of *P. thibetanus* (A, B & E) and *P. flavomarginatus* (C, D & F). A & C, Right paramere; B & D, left paramere; E–F, vesica. Scales: 0.5 mm.

length 1.63, pronotal width 2.80, length of hind femur, tibia and tarsus as 4.50: 6.00: 1.00 and width across hemelytra 3.10; ♀: 11.60, 1.49, 0.73, 2.25: 5.15: 2.23: 1.25, 3.75, 1.80, 3.25, ?: ?: ? (hind legs detached) and 3.55, respectively.

Specimens examined. CHINA: [Hubei Prov.] 1 ♂, Shien-yi-jia, Song-bai, 3. vii. 1980 (DBNU). [Fujian Prov.] 1 ♀, Chong-an, San-kong, 23. vi. 1965, S.-l. LIU (DBNU).

Distribution. China (Fujian, Hubei, Hunan and Sichuan Provs., Ningxia and Tibet Autonomous Regions).

This is a little known species distributed only in continental China. Neither its host plant nor ecology has been reported.

Parapantilius flavomarginatus MIYAMOTO et YASUNAGA

(Figs. 1 B & D; 2 C–D & F; 3 B & D)

Parapantilius flavomarginatus MIYAMOTO & YASUNAGA, 1989, Jpn. J. Ent. **57**: 259, figs. 2–4; MIYAMOTO & YASUNAGA, 1989, *in* Check List Jpn. Ins., **1**: 161; YASUNAGA *et al.*, 1993, Field Guide to Jpn. Bugs, p. 159, pl. 19, fig. 63.

Diagnosis. Recognized by the rather wide body, shorter antenna, entirely fuscous 4th antennal segment, noticeably scattered dark spots at bases of dark hairs on the pronotum and scutellum, and a pair of symmetrical lateral markings on the scutellum. A detailed description including the male genital structure was provided by MIYAMOTO and YASUNAGA (1989) with figures.

Male genitalia (Fig. 2): Parameres (C–D) with visible sensory hairs; right

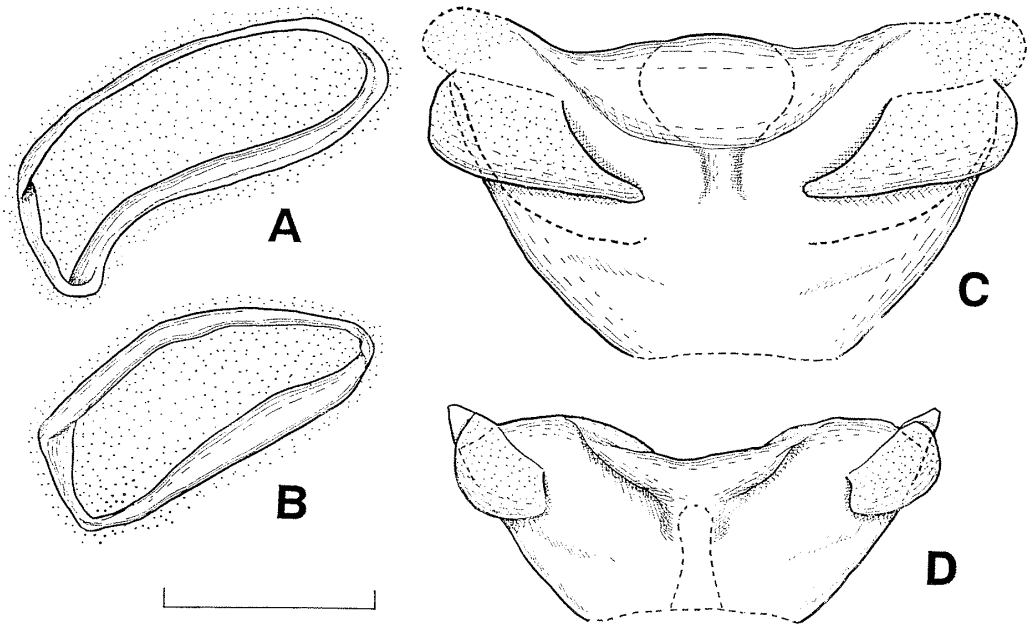

Fig. 3. Female genitalia of *P. thibetanus* (A & C) and *P. flavomarginatus* (B & D). A–B, Left sclerotized ring in ventral view; C–D, posterior wall in anterior view. Scale: 0.5 mm.

paramere (C) widely membranous ventrally. Vesica (F) with 5 visible lobe-sclerites; lobe-sclerites α and β weak, small and minutely toothed; γ enlarged, horn-like; δ small, rounded; ε well developed, elongate, longitudinally sulcate, somewhat curved at middle, with hooked apex.

Female genitalia (Fig. 3): Sclerotized ring (B) subovate, thick-rimmed; posterior wall (D) rather small, with rounded inter-ramal lobes and weak median process.

Dimensions. ♂: Body length 10.50, head width 1.40, vertex width 0.63, length of antennal segments I–IV as 1.75: 4.48: 1.70: 1.03, rostral length 2.75, pronotal length 2.30, pronotal width 3.00, length of hind femur, tibia and tarsus as 4.30: 5.60: 1.00 and width across hemelytra 3.33; ♀: 10.90, 1.45, 0.66, 1.98: 4.18: 1.53: 1.00, 2.75, 1.80, 3.23, 4.40: 5.55: 1.05 and 3.88, respectively.

Specimens examined. JAPAN: [Ryukyus] 6 ♂ 3 ♀, Koshuku, Naze C., Amami-Oshima Is., on flowers of *Deutzia* sp., 8. iv. 1989, T. YASUNAGA (HUE); 3 ♂, Shinmura, Amami-Oshima Is., 4–5. iv. 1956, S. MIYAMOTO (Paratypes, MC); 5 ♂, Mt. Yuwan-dake, Uken Vl., 29–30. v. 1993, on flowers of *Hydrangea* sp., T. YASUNAGA (HUE); 1 ♂ 1 ♀, Uragami, Amami-Oshima Is., 9. iv. 1956, T. SHIRÔZU (Paratypes, MC); 2 ♀, Ashiken, Uken Vl., Amami-Oshima Is., 11. v. 1987, T. YASUNAGA (Paratypes, HUE); 1 ♂, Monbanare, nr. Otomi, Iriomote Is., 26. iii. 1991, M. HAYASHI (HUE). TAIWAN: 1 ♂, Funkiko (=Fenchihu), 12. iv. 1965, S. MIYAMOTO (Paratype, MC); 1 ♀, Puli, 11. v. 1987, S. GOTOH (HUE); 2 ♂ 3 ♀, Mt. Hewang-shan, Puli, 20. v. 1989, S. GOTOH (HUE).

Distribution. Japan (the Ryukyus: Amami-Oshima, Okinawa and Iriomote Isls.), Taiwan.

This species is liable to be confused with *thibetanus* at first sight, but the pale basal portion of the 3rd antennal segment is much narrower, the 4th antennal segment is almost entirely fuscous and the apical 1/5 of the cuneus is darkened.

It seems to be univoltine, and the new imago appears in early April in Amani-Oshima Island, the northernmost distributional area of this species. Its host plant is not determined, while I collected several teneral adults from *Hydrangea* sp. and *Deutzia* sp. (Saxifragaceae). The general coloration of *P. flavomarginatus* is greenish when alive, but is easily fading to brownish or yellowish after death.

Parapantilius taiwanicus YASUNAGA, sp. nov.

(Fig. 4)

Almost similar in general coloration and external structure to other congeners.

Body elongate, parallel-sided, general coloration brownish; dorsal surface clothed with both dark stiff hairs and silvery decumbent pubescence. Head pale brown, somewhat shagreened, rather oblique but much vertical than those of congeners, bearing dark stiff suberect hairs; vertex 0.45 times as wide as head including eyes in ♂, 0.48 times in ♀, shallowly sulcate longitudinally; frons and tylus some-

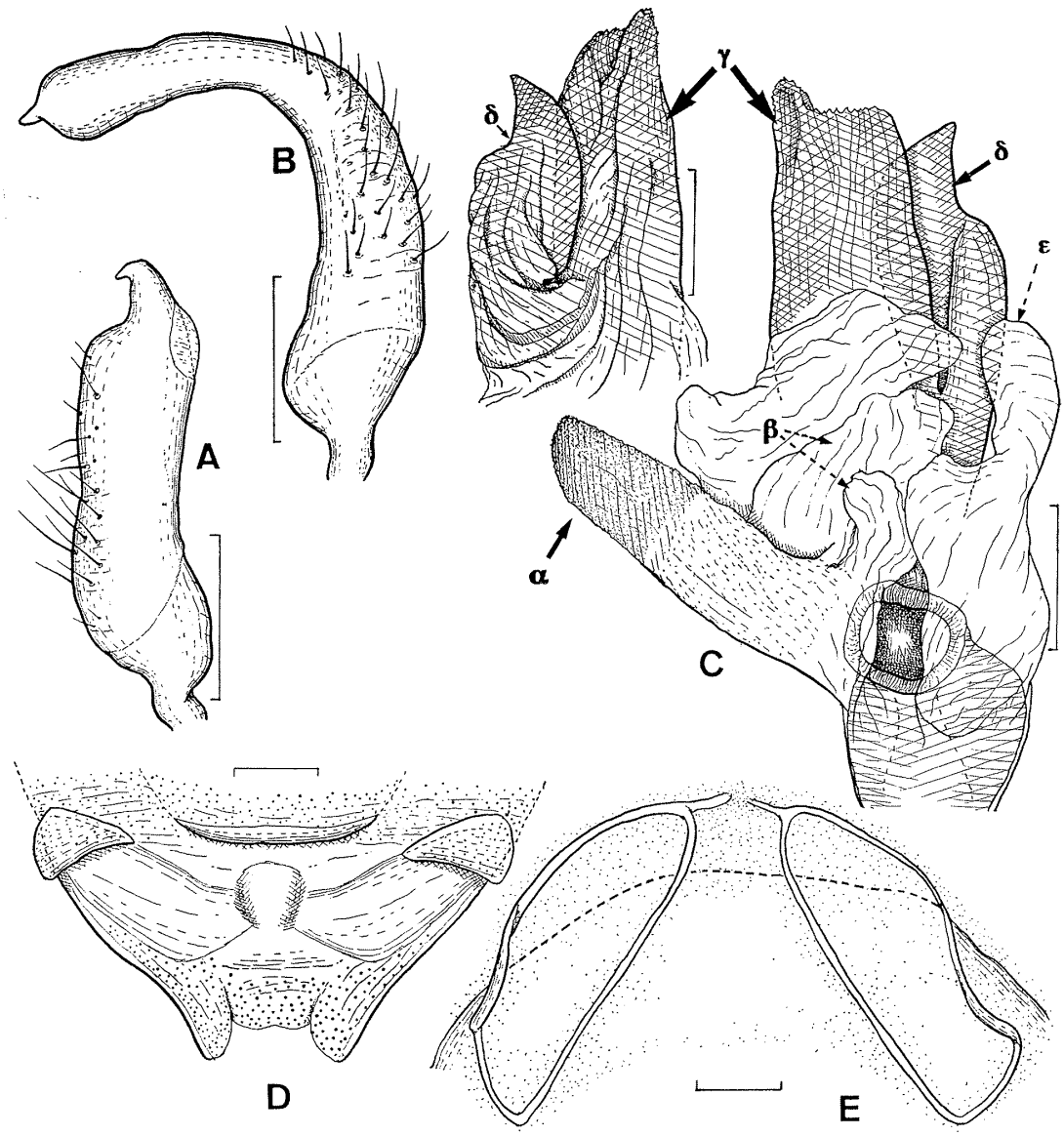

Fig. 4. Male (A–C) and female (D–E) genitalia of *Parapantilius taiwanicus*. A, Right paramere; B, left paramere; C, vesica; D, posterior wall in anterior view; E, sclerotized ring in ventral view. Scales: 0.2 mm.

what projected anteriorly, in consequence that the head in lateral aspect seems vertical. Antenna dark brown; 1st and basal 1/3–1/2 of 2nd segments reddish brown, the former uniformly covered with fuscous suberect setae, the latter slightly thickened toward apex; 3rd and 4th segments slender, filiform, the former about half as thick as 2nd, with yellow basal half, the latter about 2/3 as thick as 3rd, base (about 1/6) usually yellow; length of segments I–IV as 1.80: 4.75: 1.80: 1.06 in ♂, 1.98: 4.53: 1.78: 1.00 in ♀. Rostrum shiny brown, reaching middle coxae; apical part of 4th segment darkened; length of segments I–IV as 0.78: 0.73: 0.56: 0.83 in ♂,

0.75: 0.78: 0.55: 0.83 in ♀.

Pronotum pale brown, with a pair of dark stripes along lateral margins and a noticeable dark median spot between calli, shallowly and transversely rugose, bearing dark stiff hairs and sparse silvery pubescence, lateral margin not carinate; collar rather thick, with dark erect setae; thoracic side paler, with a dark small spot on epimeron. Scutellum brown, with pale apex, clothed with several silvery pubescence anteriorly and dark short hairs. Hemelytra widely dark chestnut brown, rather shagreened, impunctate, uniformly clothed with dark stiff hairs; corium and clavus bearing silvery decumbent pubescence; embolium and cuneus yellow, except for apical 1/5–1/4 of the latter darkened; membrane somber pale grayish brown, semi-transpar-ent, with dark brown veins. Leg pale brown, long; femur with dark patches, covered with fuscous setae; basal half of hind tibia reddish brown; tibial spines brown; apical half of 3rd tarsomere darkened; length of hind femur: tibia: tarsus as 3.85: 5.90: 0.98 in ♂, 4.45: 6.00: 1.00 in ♀. Abdomen yellowish brown, except for widely reddish dorsum.

Male genitalia (Fig. 4): Parameres rather densely provided with sensory hairs (A–B); right paramere with a narrow membranous portion subapically (A). Vesica (C) with three distinct sclerites; lobe-sclerite α weakly sclerotized, minutely spinulate; γ and δ strong, fused each other ventrally, the former hooked at apex, the latter broad, toothed along apical margin; β and ε undeveloped or reduced, completely membranous.

Female genitalia (Fig. 4): Sclerotized ring (E) rather enlarged, composed of narrow rim, with an anterior inner projection; posterior wall (D) with small interramal lobes, rather developed median process and thin dorsal structure.

Dimensions. ♂: Body length 11.20, head width 1.41, vertex width 0.63, total rostral length 2.80, pronotal length 1.64, pronotal width 2.93 and width across hemelytra 3.38; ♀: 11.80, 1.46, 0.70, 2.93, 1.88, 3.25 and 3.70, respectively.

Holotype: ♂, Mt. Hewang-shan, Puli, Taiwan, 20. v. 1989, S. GOTOH (HUE). Paratypes: 2 ♀, Musha, Taiwan, 16. v. 1987, S. GOTOH (HUE); 1 ♂ 4 ♀, Takao (=Kaohsiung), 12–13. v. 1989, S. GOTOH (HUE); 1 ♂, same data as for holotype (HUE).

Distribution. Taiwan.

This new species can be distingusihed from *thibetanus* by the narrower pale portions of 3rd and 4th antennal segments, shorter cuneus that is darkened only at the apical 1/5 and different genital structure, and is also separable from *flavomarginatus* by the uniformly brownish pronotum and scutellum that lack the scattered dark small spots.

There is no information on its ecology.

Key to the species of *Parapantilius*

1. Basal 2/3–3/4 of 3rd and basal 2/3 of 4th antennal segments pale (Fig. 1 A);

more than apical 1/3 of cuneus darkened (C) ..... *thibetanus*

— Basal 1/3 of 3rd antennal segment pale; 4th usually entirely dark, or extreme base narrowly pale (Fig. 1 B); apical 1/5 of cuneus darkened (D) 2

2. Pronotum and scutellum with scattered dark small spots at bases of dark hairs; the latter with a pair of dark lateral markings..... *flavomarginatus*

— Pronotum and scutellum almost uniform in color, lacking such dark markings or spots ..... *taiwanicus*

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